Space Weather Forecast

Issued on Friday 7 February 2025 at 01:19 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate radio blackouts expected. Increased near-term chance of Minor solar radiation storm. Increasing chance of Minor/Moderate geomagnetic storms into UTC weekend.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was Moderate over the past 24 hours, with two Moderate class flares from the largest and most active region on the visible disc.

There are now up to ten active regions on the Earth-facing side of the Sun. The northwest remains the dominant quadrant, with a cluster of large and complex regions, including the largest region which grew slightly in size and area, while remaining magnetically complex. There are two smaller regions which have moderate magnetic complexity, one of which also showed slight growth. The remaining regions on the visible disc are small, magnetically simple and have been stable or shown slight decay.

A Coronal Mass Ejection (CME) was visible on coronagraphs from the largest Moderate class flare. However, confidence is low regarding the analysis of this CME as it was very faint in the limited imagery available. Currently there appears to be a slow, weak Earth directed component to this CME, potentially arriving late day 4 (10th).

Solar Wind / Geomagnetic Activity: Solar winds where predominantly at Slightly Elevated speeds between 430-480 km/s, peaking briefly at 500 km/s at 06/1815 UTC. The cause of this enhancement is uncertain, possibly from a glancing interaction with a weak CME from the 2nd Feb, but also potentially from an unidentified coronal hole feature.

The strength of the solar wind's magnetic field was predominantly at moderate levels until the evening, then declining to become weak. The north-south component initially fluctuated but then became predominantly positive for the second half of the day.

The net result of the above solar wind measures was Quiet to Unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: High energy proton flux remained at background levels.

Four-Day Space Weather Forecast Summary

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

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Solar Activity: Moderate activity is expected with further Moderate class flares, with an ongoing Chance of an strong flare, primarily from the largest and magnetically complex region in the northwest.

Solar Wind / Geomagnetic Activity: Two CMEs feature in the forecast - firstly the CME from early on 05 February, which has a low chance of delivering a glancing blow late today or into tomorrow (Friday 07 into Saturday 08 February). The other CME is associated with the Moderate class flare on the 6th, which may arrive late on day 4 (10th). Both events are low confidence.

A solar wind enhancement from a coronal hole feature is expected to arrive during day 3 (9th), most likely during the second half of the day. Solar winds are expected to become elevated, to potentially strong, in association with this feature and persist through the remainder of the forecast period.

Predominantly Quiet geomagnetic activity is expected, then potentially increasing Unsettled to Active for a time late today or into tomorrow (Friday 07 into Saturday 08 February). Activity is then expected to increase again during days 3 and 4 (9th and 10th) becoming Unsettled to Active with occasional Minor to Moderate Geomagnetic storms intervals likely.

Energetic Particles / Solar Radiation: There is an increasing chance of minor solar radiation storm conditions as the cluster of sunspots in the northwest rotate into a better-connecting position with Earth.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	**G1 to G2**	No	20	20	60	50
Strong	**G3**	No	1	1	5	1
Severe	**G4**	No	1	1	1	1
Extreme	**G5**	No	1	1	1	1

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Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	70	70	70	70
Very Active	R3-R5 (X Class)	No	20	20	20	20

Solar Radiation Storms (High Energy Protons)

Radiation Storms	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	20	20	25	25
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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